



planes

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STABLE AIRCRAFT PROGRAM KEY TO ECONOMY

State Department Uses Air in 95% Of Courier Trips

Back in 1903, when Secretary of State John Hay dispatched top-secret messages by courier to the other side of the world, months passed before delivery and receipt of the replies.

A message going to Bangkok, Siam, in those days took nearly three months.

That same year, 1903, the Wright Brothers invented the airplane and changed the face of the earth—and the tempo of diplomacy.

Modern Couriers Fly

Today, in a tense world and an air age, one of the State Department's 89 couriers can deliver an important document to Bangkok in less than three days—one-thirtieth the time it took his predecessor 50 years ago. And he can travel on regularly-scheduled airlines all the way.

These couriers constitute one of the world's most vital and secret "special delivery" agencies. Each year, they carry pouches of the world's most momentous documents a distance of almost 10 million miles by air.

Visit 88 Countries

In fact, they depend on the speed of America's fleet of modern, high-speed aircraft for nearly 95 per cent of all their official travel. Each year they visit 88 foreign countries and dependencies in the course of their duties—each individual courier averaging four-and-a-half circuits of the globe each 12 months.

In addition to the traveling done by these messengers, the State Department reports that in the fiftieth anniversary year of powered flight, 66 per cent of all its official overseas and foreign travel is via airliners, which carry American diplomatic representatives, their families and dependents to posts in every part of the world.

More Engineers Needed

Mounting requirements for engineers and technicians in modern aircraft production is evidenced by the fact that, at one major airframe company, 18 per cent—almost one of every five—of the total employees is engaged in engineering, research and development work.

EXPANDED PRODUCTION BASE TAKES TIME

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JANUARY, 1951
Non-aviation manufacturing plant receives fighter production contract.

JULY, 1953
First fighter makes initial test flight.

Long-range planning is required to assure the nation's aircraft production potential. It takes time to buy the tools and start production, even after an aircraft design is ready.

'PLANES' Source: Typical 'Second-Source' Manufacturer

Ramsey Reviews Air Expansion Since June '50

By
DeWitt C. Ramsey
(Adm., USN, Ret.)
President, Aircraft Industries Association

Despite readjustments in some manufacturers' schedules, plans contemplate the U.S. aircraft industry will continue during the coming year to produce military planes at a rate of 1,000 to 1,100 per month—



Ramsey

almost five times the rate of June, 1950, when the Korean War began.

These current schedules are based upon an interim program adopted by the Department of Defense, pending a comprehensive review of the nation's military requirements. The study, which is to be undertaken this summer and fall by the Joint Chiefs of Staff and the National Security Council, is expected to determine the level of U.S. military aircraft production over the next few years, and the mobilization tasks to be assigned to the aircraft industry.

Aircraft Schedules

Until that study is completed, schedules for the production of combat-type aircraft remain virtually unchanged for the remainder of 1953—and call for a continuation of the present level of output through the early months of 1954.

At the present time 69 different types of military planes are being produced for the military services, including 34 types for the Air Force and 35 for the Navy. In the more than three years since the Korean War started, the proportion of jet combat-type aircraft being built has increased steadily—and today, well over half the military planes coming off production lines are jet-powered.

During the remainder of this year and calendar 1954, new Air Force and Navy jets—superior in performance, we predict, to any being built in any nation in the world—will enter production.

(See LONG-RANGE, page 3)

Highest Volume of Aircraft Exports Since World War II Expected in '53

More U.S.-built aircraft will be shipped to foreign nations this year than at any time since the end of World War II, with dollar value of exports expected to reach more than \$820 million.

Total value of exports for 1953 will be nearly 3.5 times that of 1950, when the Korean War began, and almost seven times that of 1939, the year World War II started in Europe, it is predicted by the Aircraft Industries Association Export Service.

Most of these planes will be military craft shipped under the Mutual Security Program to U.S. allies.

But American prominence in the civil aviation field is evidenced by the fact that approximately \$50 million worth of civil planes and engines will be exported this year. This does not include the millions of dollars which will be spent for military, cargo and used transport aircraft, engines of 400 h.p. and over, propellers, instruments and all accessories.

(See FIFTY-FIVE, page 2)

PLANES

Planes is published by the Aircraft Industries Association of America, Inc., the national trade association of the manufacturers of military, transport, and personal aircraft, helicopters, flying missiles and their accessories, instruments and components.

The purpose of *Planes* is to:

Foster a better public understanding of Air Power and the requirements essential to preservation of American leadership in the air;
Illustrate and explain the special problems of the aircraft industry and its vital role in our national security.

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ALL MATERIAL MAY BE REPRODUCED—MATS OF ALL CHARTS ARE AVAILABLE

Aircraft Production 'Miracle'

By

George F. Hannaum

Director, Industry Planning Service
Aircraft Industries Association

Modern technology has few problems of greater complexity than those faced in translating blueprints and dollars into high-performance military aircraft. The production effort itself is tremendous—tremendous in dollars, tremendous in terms of employment, tremendous in pounds of equipment that must be produced.

Once designs are conceived and orders received for quantity production, a unique responsibility rests on the shoulders of the aircraft production executive. His specialized abilities have no counterpart in commercial industries, where production can be planned for definitely fixed quantities, with frozen designs, under centralized authority.

As a measure of the immensity of the job, the manufacturer of an order of 100 jet aircraft must build or order, and schedule into production, more than 16.5 million individual machined parts. The problems are infinitely multiplied by the fact that, unlike such products as automobiles, aircraft designs are never frozen, production runs are never firmly established, and many essential components are procured by the military and delivered to the airframe manufacturer on schedules which may fluctuate considerably.

One of the laws of conventional mass production is that designs must be frozen. But in aircraft production, where improvements in the product can mean the difference between victory and defeat, designs can never be completely frozen. At any point in the production process, changes may be necessary—whether dictated by the need for meeting new military requirements, for incorporating improved equipment, for substituting available materials for critical defense materials, or for correcting even the most minor engineering errors.

In commercial production, such changes can be deferred until completion of the most economical production runs. In the military aircraft field, the highest quality must be a prime consideration in every plane produced.

Moreover, the incorporation of new equipment or design changes in a military plane presents problems which producers of civilian goods do not have to face. For example, the addition of a 17-pound windshield wiper on a combat aircraft can result in an increase of 127 pounds in the weight of the plane and an increase of \$5,000 in its price. *It is necessary to add 7½ pounds to the gross weight of a plane for every single pound of equipment that is added.* Obviously, if performance and strength are to be maintained, the addition of more equipment means that the fuselage must be strengthened. The heavier fuselage requires stronger wings. The increased weight requires greater power. The greater power requires more fuel capacity, and so on.

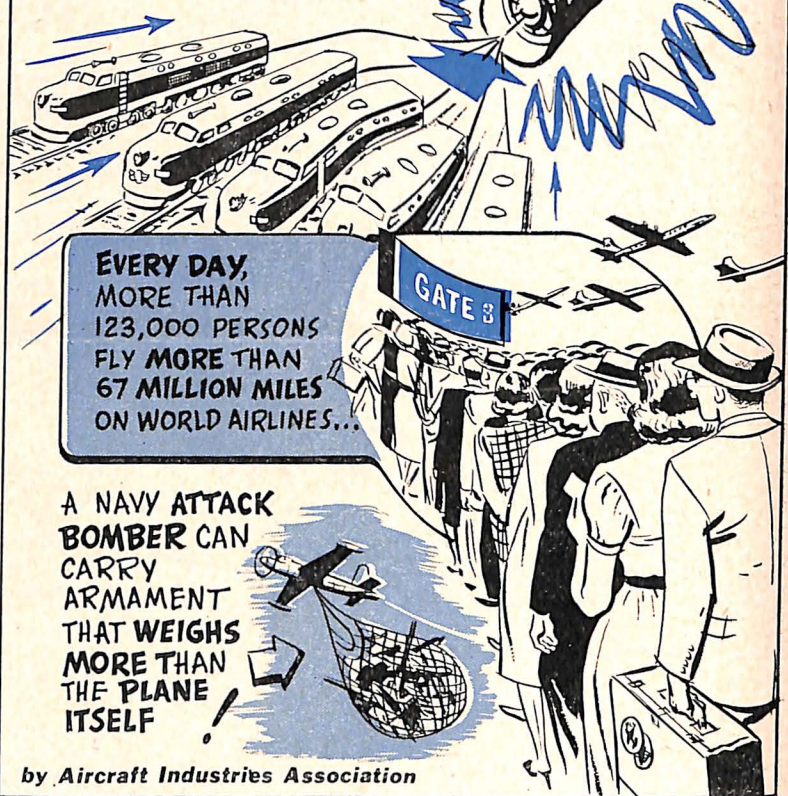
Beyond all this, the production executive in the aircraft industry must predicate all his planning on the timely receipt of Government Furnished Equipment, purchased by the military in order to achieve maximum standardization and resultant economy.

With these unique problems, there is always the necessity for maintaining *expansibility*—the ability to increase production quickly from the going rate. And while expansibility is retained, the manufacturer must be prepared at all times for the cancellations and revisions in orders which, in the past, have accompanied changing international situations and new military requirements.

The so-called "miracle" of quantity aircraft production stems basically from the ability of manufacturers to schedule many thousands of parts so they arrive at the final assembly line at the right time, in the right quantities, in working order. The aircraft industry's ability to do this job, which has no counterpart in the experience of other industries, is a prime factor in American air leadership.

PLANE VIEWS

A NEW EXPERIMENTAL TURBOJET ENGINE NOW IN OPERATION IS MORE POWERFUL THAN 5 LOCOMOTIVES! IT BREATHES A TON OF AIR A MINUTE..!



EVERY DAY, MORE THAN 123,000 PERSONS FLY MORE THAN 67 MILLION MILES ON WORLD AIRLINES...

A NAVY ATTACK BOMBER CAN CARRY ARMAMENT THAT WEIGHS MORE THAN THE PLANE ITSELF

by Aircraft Industries Association

PLANE FACTS

- To test a jet bomber, the Air Force flew it the equivalent of nearly 17 times around the globe!
- A typical modern fighter contains over 250,000 rivets.
- Approximately 250 smokejumpers — firefighters hired to parachute to forest fires — are working for the U.S. Forest Service this summer. Last year, these smokejumpers made 836 jumps and stopped 267 forest fires.
- The air transportation industry has grown at an average annual rate of nearly 25 per cent in the past decade.
- Last year, civil aircraft sprayed over 5,200,000 gallons of chemicals and spread over 32,400,000 pounds of dust over five million agricultural acres in Oregon, Montana, Washington and Idaho.
- A new portable aircraft starter, developed by a West Coast aircraft manufacturer, improves the combat efficiency of a plane by cutting a quarter-ton off its weight—enough to allow a speedy jet to carry an additional 500-pound bomb or several more rockets.

Fifty-Five Nations Buy U. S. Aircraft In Past Five Years

(Continued from page 1)

sories, spare parts and ground handling equipment.

Eighteen of the 55 nations that have bought \$2.25 billion worth of American-made aircraft during the past five years lie to the north and south of the United States' borders. Mexico, Brazil and Canada have been the industry's top three customers, but the final destinations of the bulk of the equipment spreads all over the world—as far as Formosa, Palestine, Yugoslavia, Denmark, Australia and the Union of South Africa.

Mexico, with the purchase of 693 planes plus parts, has been the biggest buyer of American non-military equipment during this five year period, but the Netherlands has topped the list for heavy transports, aircraft weighing 30,000 pounds and over, and France has been the largest purchaser of new light utility planes.

American helicopter sales also attest to this nation's leadership in that type of aircraft manufacture. Although the helicopter industry is just seven years old, U.S. helicopters fly on every continent of the world and 35 nations have purchased these rotary-wing planes for civil transport services.

Long-Range Air Policy Would Cut Plane Costs

(Continued from page 1)

Concurrently, all major aircraft manufacturers will continue work on guided missiles which are expected—at some time in the future—to be capable of performing the missions of many of the current types of interceptors, fighter-bombers and even long-range strategic bombers.

The forthcoming high-level re-assessment of the nation's military requirements thus comes at a time when the aircraft industry has achieved a substantial rate of production, and when the industry has virtually completed the scheduled expansion which began shortly after the outbreak of the Korean War.

Regained Potential

A few figures give a measure of the rejuvenated aircraft industry, which has regained much of the production potential lost when it was decimated in the precipitate demobilization following World War II:

In June, 1950, the entire industry employed only 257,000 persons. Shortly after the expansion began, the call for manpower—particularly for critical engineering and technical skills—went out from all aircraft plants. Less than 1% of the general applicants possessed these required skills and experience, and as a result it was necessary to employ many unskilled workers and to establish broad training programs.

Despite a continuing shortage of engineers and technicians, employment has increased to the point where 750,000 Americans are working in aircraft plants, making the industry the nation's second-largest manufacturing employer. Moreover, the effect of the aircraft production program today is felt by approximately a million Americans who are employed by the industry's 61,000 subcontractors and suppliers.

Floor Space Increased

Along with the vast expansion of manpower, the industry undertook an accompanying increase in floor space available for production of military aircraft. In a period of slightly more than three years, floor space was more than doubled, rising from 63.5 million square feet to more than 128.9 million square feet. Most of these plants, unlike those of three years ago, have virtually completed their tooling and their basic employee training programs.

The cost of re-building facilities, re-training workers, and re-tooling plants has necessarily been high—an inevitable after-effect of the wholesale destruction of this vital defense industry in the immediate months and years following World War II.

It is expected, however, that the Defense Department and the Joint Chiefs of Staff—in their study of the nation's defense and mobilization needs—will place great empha-

sis on conservation of the aircraft industry's present potential production capacity.

Stabilized Production

Air Force Secretary Harold Talbott has said that "the defense job has always been ours to do, but in the past we often preferred the luxury of ignoring it. In the world of today, we dare not take that risk. There appears to be no prospect for a change in the world climate of such nature that will permit us to eliminate the heavy cost of national defense in our future plans. We must establish production for national defense on a stable, continuous, orderly and permanent basis, and with the aid of industry itself, we hope to reach that objective."

Defense Secretary Charles Wilson, on the same subject, has emphasized that consideration will be given in the defense studies to maintaining the aircraft industry at a level so its "potential production capabilities are reasonably retained over a period of years as an essential part of the mobilization base."

Past Recommendations

Almost six years ago, the President's Air Policy Commission called attention to the need for constant revision in our defense programs in order to keep ahead of the rapidly-changing strength and techniques of other nations in an age of scientific revolution. At the same time, the Commission pointed to the fact that "year-to-year planning of aircraft production, which has been forced upon the services by current budgeting practice, must give way to long-term planning." It was estimated that "savings on the uninterrupted production of airplanes over a five-year period, as compared to five annual procurements of the same total number of airplanes, could run as high as 20 to 25 per cent."

All evidence indicates that the Defense Department subscribes to

More Than 50,000 Small Businesses In 47 States Help Build Air Power

In almost every town in the United States, there's a shop down the street that plays a vital part in building American air power.

Oil men in Texas, lumbermen in Oregon, rubber workers in Ohio, and plastics manufacturers in Maine fit into a vast technological jig-saw puzzle that must be complete before a single modern aircraft rolls off a production line.

Also in the picture are radio builders in Iowa, fire-brick workers in Missouri, camera makers in New York—and millions of other Americans in at least 47 states.

The aircraft industry itself employs some 750,000 persons in 22 states. They work for the manufacturers of airframes, engines, propellers, guided missiles and major aircraft components.

Aircraft Subcontractors

Behind them stand an army of more than a million other Americans, employed by the aircraft industry's 61,000 subcontractors and suppliers, supplying parts and materials that go into the modern fighting planes for U.S. military forces and civil air fleets.

A partial survey by the U.S. Air Force of 98 defense contractors

the philosophy of long-term planning expressed by the President's Air Policy Commission in December, 1947, and that a basic consideration in planning the mobilization will be to achieve economy through stabilized production orders.

Basic Economy Factor

The lessons taught by the disastrous demobilization after World War II, followed so shortly by the necessity for rebuilding production facilities at the expense of billions of tax dollars, have been well underscored since the Korean War started. No single factor can contribute more to defense economy, without sacrificing military strength, than can the elimination of the wasteful peaks-and-valleys of production effort which have been experienced by defense industries in the past.

shows that more than 50,000 *small businesses alone* share in defense spending. The survey covered subcontracting activities of 12 airframe, 10 powerplant, 31 electronic, and 45 miscellaneous manufacturers.

The Air Force's study did not, however, include figures on the role played by businesses with whom these aircraft subcontractors and suppliers must deal in order to play their part in building American air power. Nor did it reflect the impact of this spending upon the economic life of the communities in which these businesses are located.

Manufacturer's Experience

The magnitude of the industry's impact on the national economy is indicated by the experience of a single airframe manufacturer in 1952. During that 12-month period, this plane-builder purchased 60,000 truck-loads and 1,267 railroad car-loads of material—weighing more than 50,000 tons—from 8,000 subcontractors and suppliers in every part of the United States.

These purchases included not only basic aircraft parts, but such items as air conditioners built in Texas, hardwood cut in Georgia, gun sights from Minnesota, adhesives from Michigan, aluminum sheet from Washington, bomb sights from Wisconsin and thousands of additional items from these and other states.

500,000 Items

In all, this one company purchased more than 500,000 individual items during 1952.

For the company, purchases broke down as follows: castings and forgings, \$3,109,840; metal sheet, \$7,275,613; extrusions, bar and tube, \$5,891,237; hardware, \$19,719,810; equipment, \$58,817,471; gasoline and aircraft fuel, \$515,464; miscellaneous bulk material, \$6,961,608; tooling and shipping material, \$3,902,561.

These dollars—and the millions of other dollars spent by other aircraft prime contractors throughout the nation—found their way to the main streets and shopping centers of almost every city in the country.

FIFTY YEARS OF FLIGHT 1903-1953

WORLD'S FIRST MILITARY PLANE
ACCEPTED BY U.S. SIGNAL CORPS
JULY 31, 1909
TOP SPEED . . . 42 M.P.H.

MODERN JET FIGHTER
WEIGHS 13 TIMES MORE,
HAS OVER 277 TIMES THE POWER,
Can fly over 650 m.p.h. faster

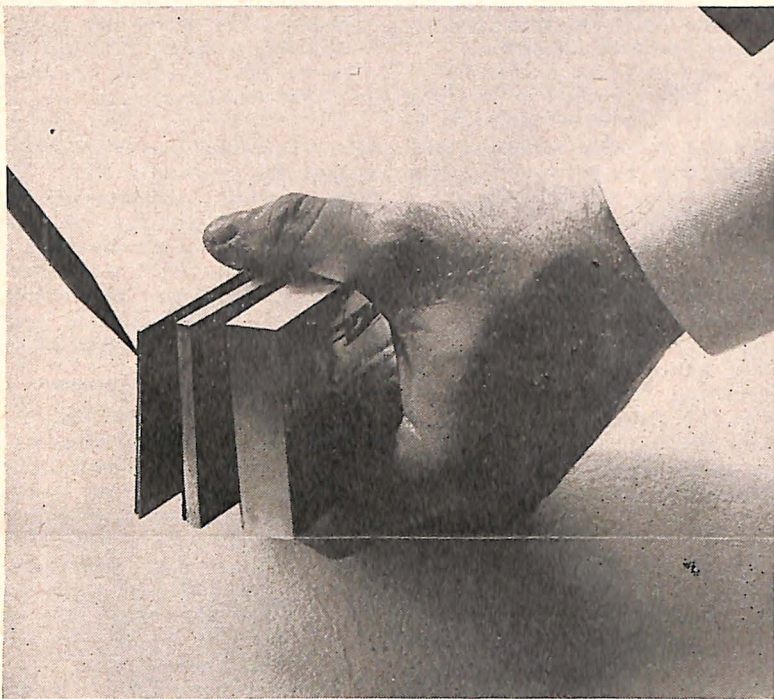
50TH ANNIVERSARY OF POWERED FLIGHT

PROGRESS

SECURITY

'PLANES'

Metal Thick as a Destroyer's Hull Goes Into Wing Skin of Jet Bomber



Heavier materials are required for sonic bombers. Photo shows, from left, wing skin thickness in WW II medium and heavy bombers, and modern jet bomber.

The graceful lines of a modern jet bomber give few hints of the ruggedness and strength which must be built into each part.

The wings from a distance look almost thin, yet they weigh 18 tons. And the wingskin before shaping is as thick as the hull of a destroyer.

Cost of these sturdy and complex wings (see photo for comparison) is understandably far greater than for those of the relatively simple World War II bombers.

Each wing contains 14,698 bolts and rivets—some with tolerances as small as .0015 of an inch. Construction is so precise and engineering so accurate that, despite the thickness of the skin, the wing tips are capable of moving up-and-down in air turbulence in a 20-foot arc!

An interesting sidelight: Wings of this type are so aerodynamically smooth that a scuffed upper surface could decrease the aircraft's top speed by as much as 20 miles per hour. The manufacturer reports that ground crews, for this reason, are required to wear soft-soled shoes when walking on the surface of the wing.

Eleven Million Dollars Paid Weekly To 135,000 Women Aircraft Workers

The airplane is putting money in the pocketbooks of American women.

In U.S. aircraft plants alone, paychecks made out to women total nearly \$11 million every week.

These millions of dollars—some \$572 million annually—are distributed among almost 135,000 women who today earn their living building aircraft for the U.S. military forces and the world's civil air fleets.

Yet this payroll is only part measure of the total economic impact of aviation on the modern American woman.

An additional 20,000 women are employed by America's scheduled airlines.

Another 18,000 have found aviation careers in the Air Force, Navy and Marine Corps.

And other thousands are employed by airport operators, government

agencies dealing with aviation, aircraft subcontractors and suppliers and such organizations as air travel agencies.

The work these women do varies. In manufacturing and subcontracting plants they perform many of the jobs of World War II, but today's complex aircraft have opened up many additional jobs.

In radar and weather stations, in airways traffic control towers and in airline operations offices women help operate the huge fleet of airline transports. Others work as clerks or on ticket counters. And still others fly high above the clouds as hostesses.

In the armed forces, women perform a number of jobs similar to those handled by airline personnel. In addition, almost 3,000 Flight Nurses are in military service.

Scheduled Airliners Span North Atlantic 200 Times Per Week

Every seven days, approximately 200 scheduled airliners cross the North Atlantic ocean—an average of 100 flights in each direction each week.

These planes are operated by 12 U.S. and foreign airlines now flying between the North American continent and Europe.

They are a part of the total world airline fleet of some 4,000 transports, four-fifths of them produced by the aircraft plants of the United States.

These figures are revealed in a summary of civil aviation activity in 1952, prepared by Dr. Edward Warner, president of the council of the International Civil Aviation Organization.

The survey indicates that trans-Atlantic fares have remained almost constant during the past seven years, while the best scheduled airline time between New York and London has been reduced by 5 hours and 50 minutes. Best scheduled time in 1952 was 11 hours and 45 minutes; in 1946, it was 17 hours and 35 minutes.

Standard first-class one-way passenger fares at the peak traffic season increased only \$2 during the period (from \$547 to \$549) despite a 36% increase in the U.S. cost-of-living index, Dr. Warner reports.

The first scheduled North Atlantic service began only 14 years ago, in 1939.

Yet last year, the airlines carried more passengers between the U.S. and foreign countries than did ships.

Air Quotes

"We have a tremendous asset in our industrial production and the Communists respect it. Despite Soviet strides in the production and the development of weapons, we still possess a superiority, but it is a margin that we must protect. We must continue to place great emphasis on research and development in the quest for more effective weapons. We must continue to exploit the technological capabilities that are ours. We must make up the disparity in manpower between the free world and the world of our aggressors with better weapons and sounder organization." — Air Force Secretary Harold E. Talbot, May 16, 1953.



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Air Freight Economies

Extra profits amounting to as much as \$35.60 for every 100 pounds of merchandise can be realized by merchants who take advantage of the swiftness of air freight for shipping, according to a survey in the wearing apparel field made by a leading scheduled airline.

The survey points out that merchants are able to maintain lower inventories, thus cutting operating costs, when they can be assured of fast air freight delivery on orders.

THE PLANTS BEHIND THE AIRCRAFT PLANTS

